Day 2

2018년 10월 16일 화요일 오전 8:56

1943 MCP 뉴런

"Weight" (가중치)

X_1 W_1 → 0.01

0.1 0.1

X_2 W_2 → 1.0

0.1 10.0

특징수

$$z = \sum_{i}^{n} W_i X_i$$

$$= W_1 X_1 + W_2 X_2 + \cdots + W_n X_n$$

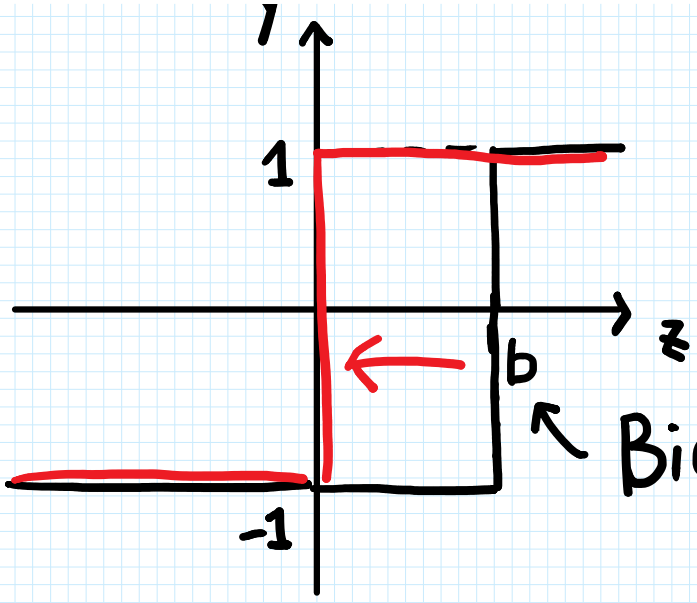
$$= [X_1 X_2 \cdots X_n] [W_1 \cdots W_n]^T$$

$$= X \cdot W^T = W^T X$$

내적

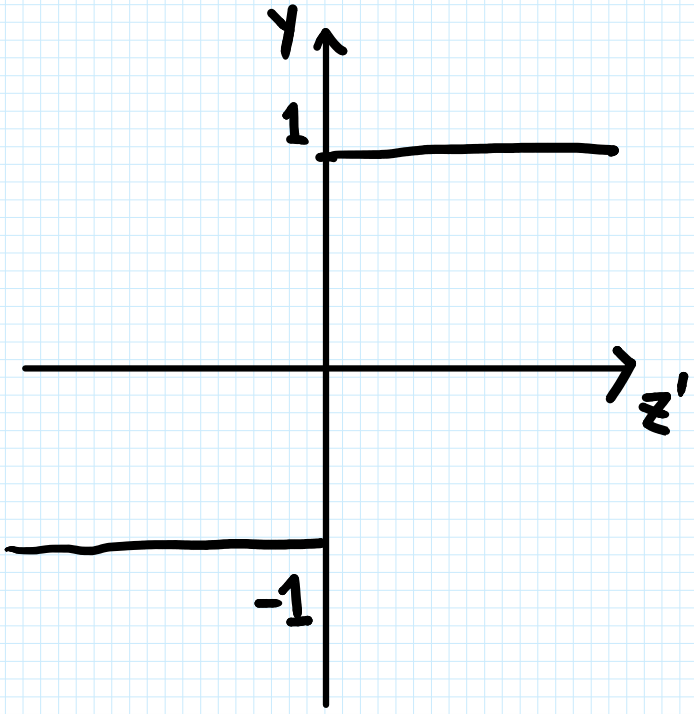
y ↑

$\{ 1, z > b$



$$y = \begin{cases} 1, & z > b \\ -1, & z \le b \end{cases}$$

↖ Bias "편향"



$$y = \begin{cases} 1, & z' > 0 \\ -1, & z' \le 0 \end{cases}$$

$$z' = z - b$$

$$= w_1 x_1 + w_2 x_2 + \cdots + w_n x_n + b'$$

$$= w_0 x_0 + w_1 x_1 + w_2 x_2 + \cdots + w_n x_n$$

x_0 = "1"

$$= \sum_{0}^{n} w_i x_i \,, \quad x_0 = 1$$

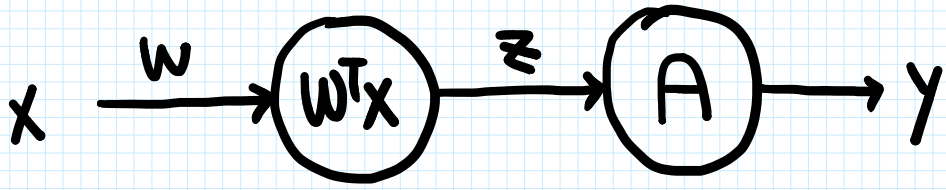
$$= w^T x \,, \quad w = [\underbrace{w_0}_{=b} \cdots \; w_n]$$

$$= w^T x + b$$

"오차"

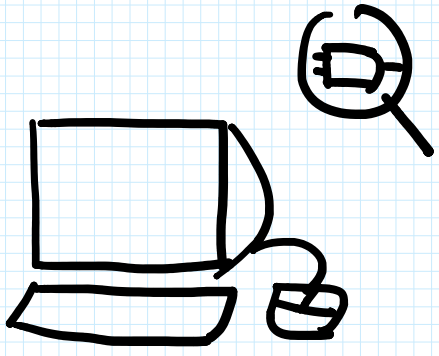
매개변수 ≈ 가중치

$$\theta = (w, b)$$

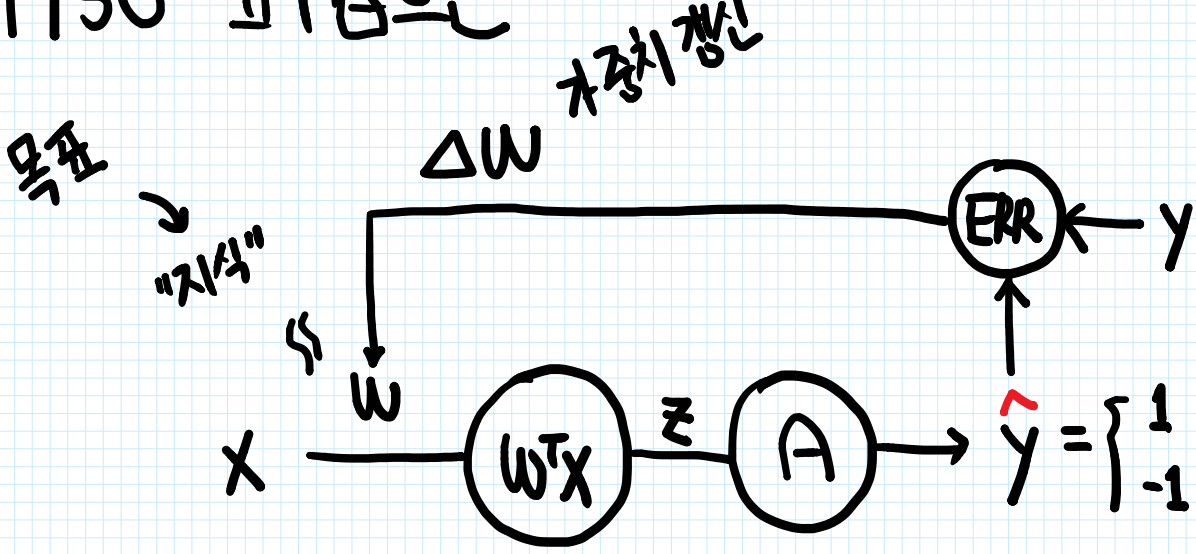


특수성 → 일반성

Smart Phone



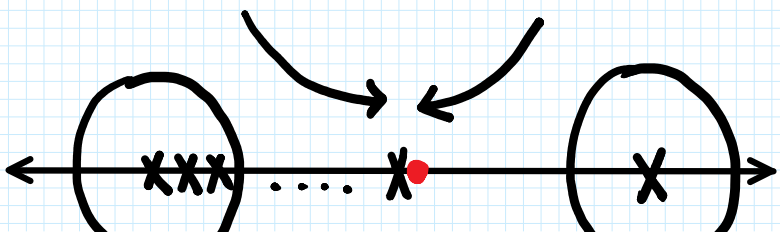
1958 퍼셉트론

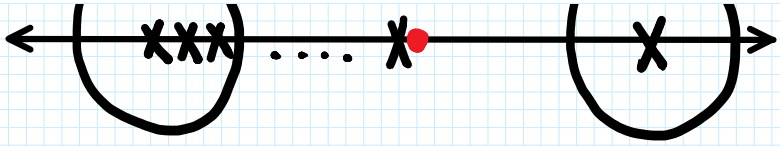


y	ŷ	Error = y - ŷ
1	1	0
1	-1	2
-1	1	-2
-1	-1	0

학습 := $\Delta W_i = \eta \, Error \, X_i$

학습률 < 1.0

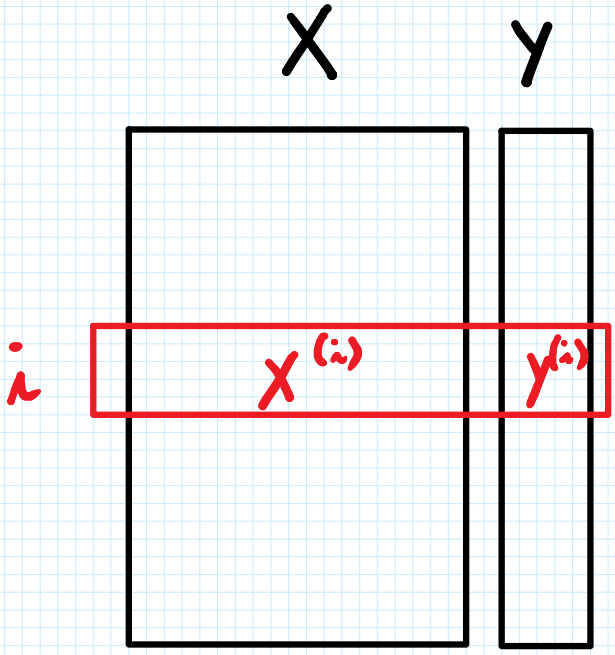




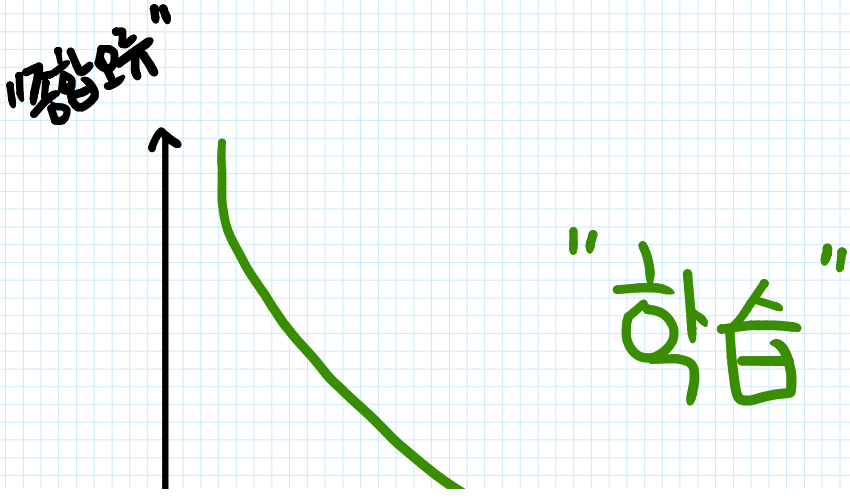
$X_1 \curvearrowright W_1$ 0.1 → $W_1' = 0.2$ 100%

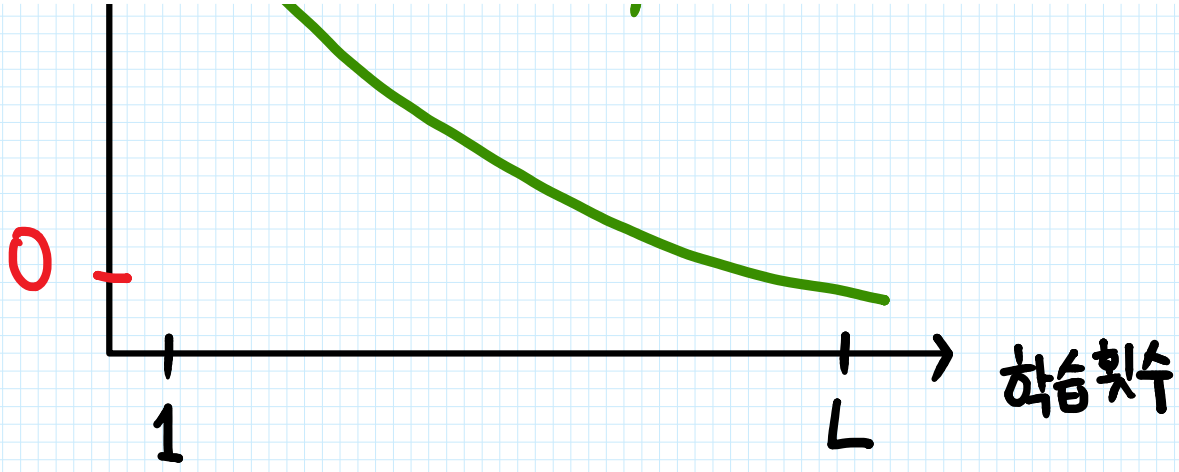
$+\Delta W$ 0.1

$X_2 \curvearrowright W_2$ 10.0 → $W_2' = 10.1$ 1%



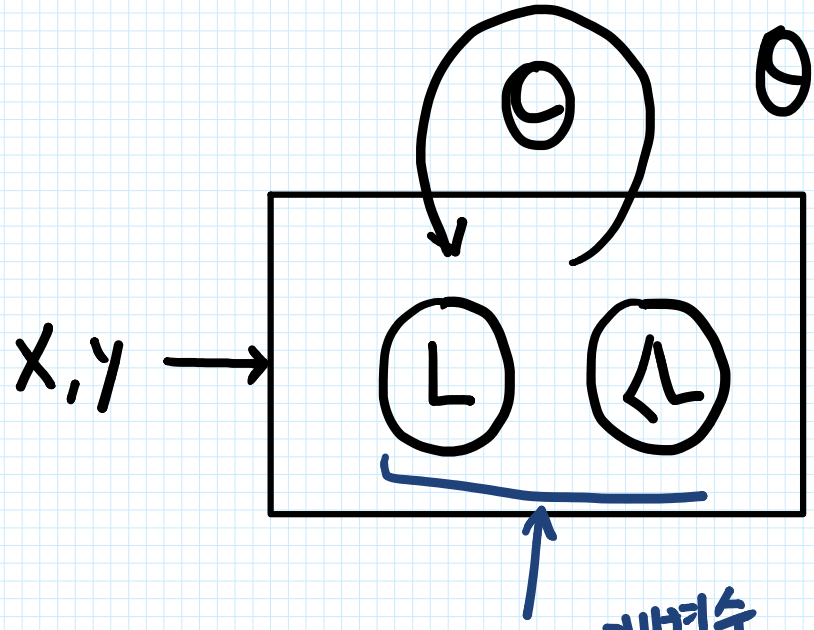
$y^{(i)} - \hat{y}^{(i)} = Error^{(i)}$



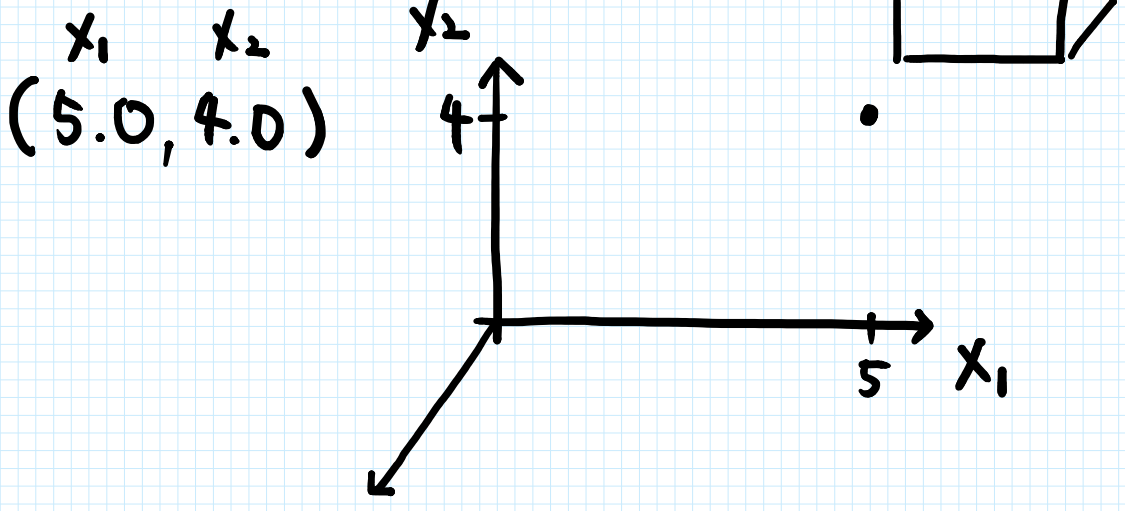


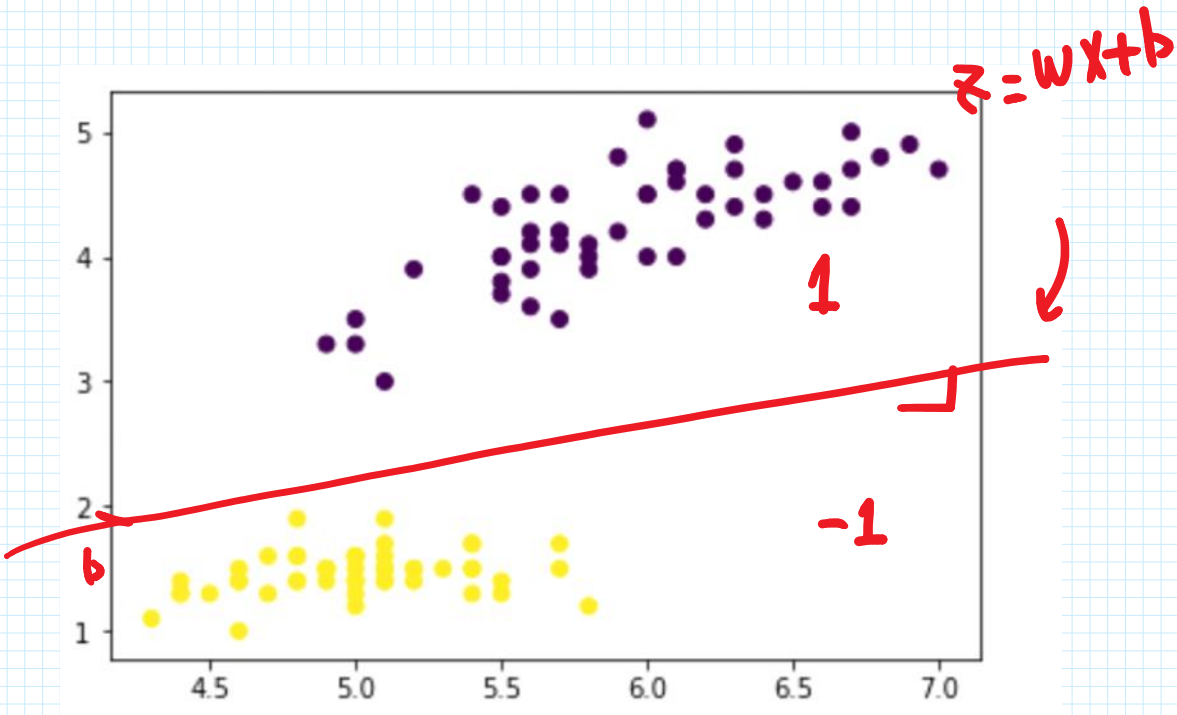
매개변수 Param.

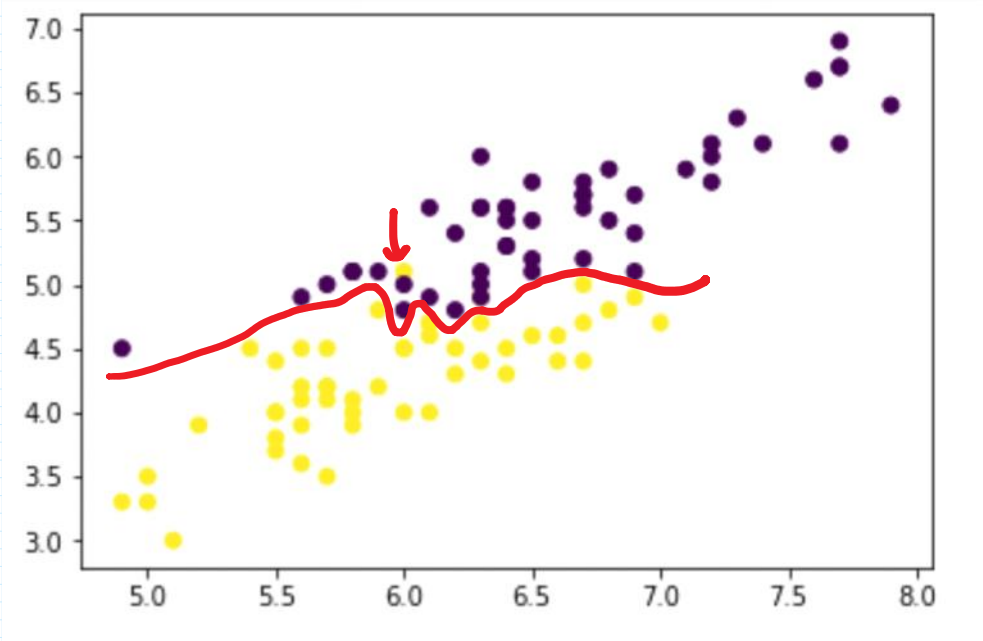
$\theta = (w, b)$

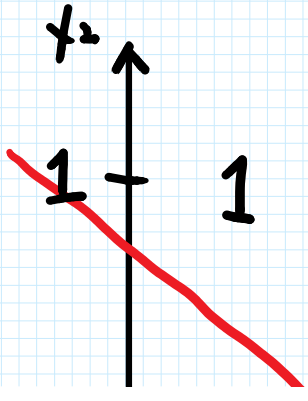


상위 매개변수
Hyper Param.







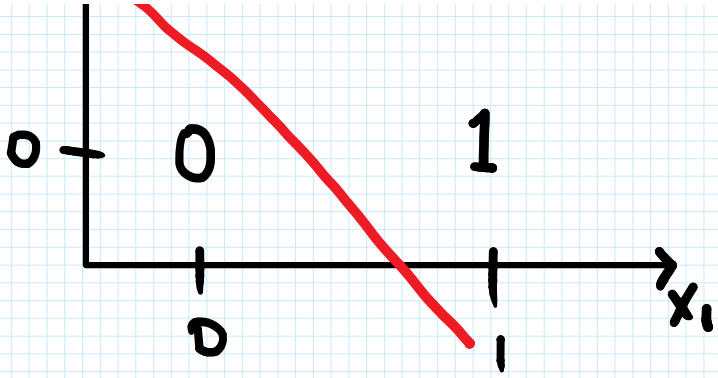


선형적

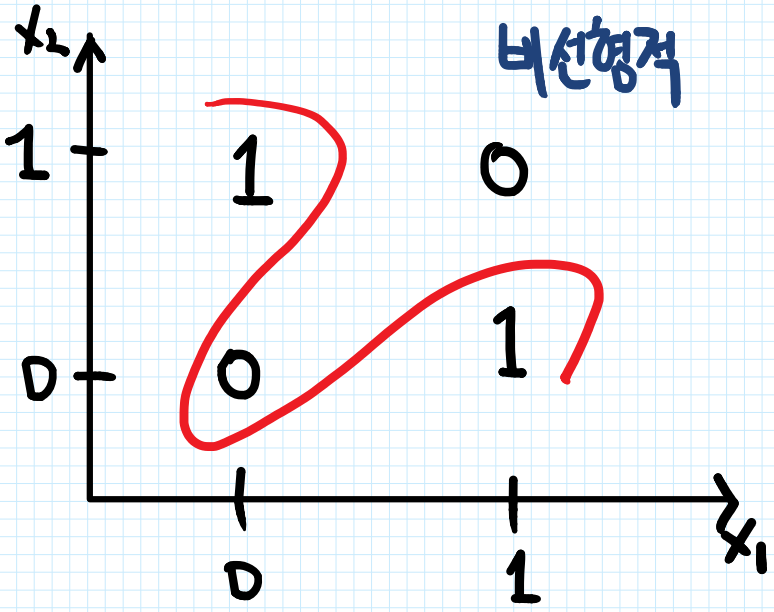
1

OR

x_1	x_2	y
0	0	0

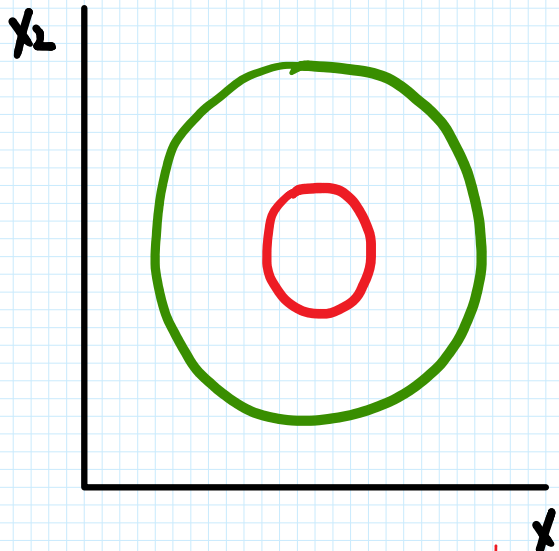


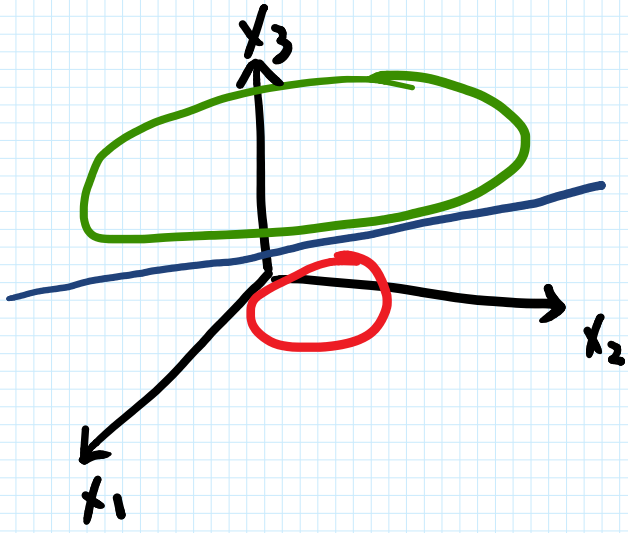
0	0	0
0	1	1
1	0	1
1	1	1

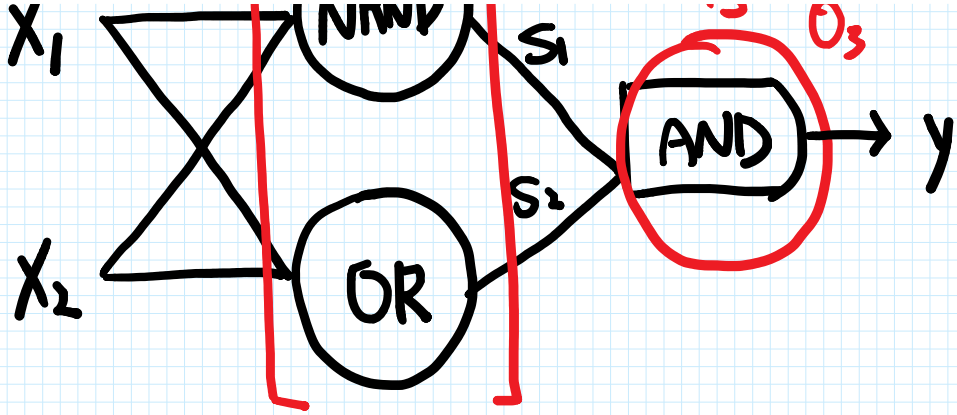


0	0	0
0	1	1
1	0	1
1	1	0

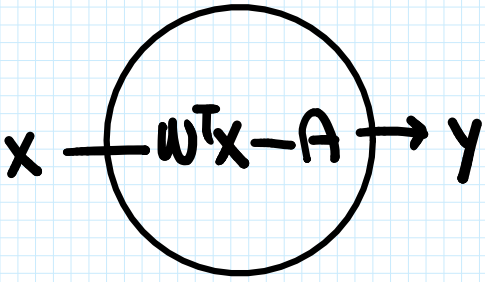
XOR







뉴런 = 퍼셉트론 = Node

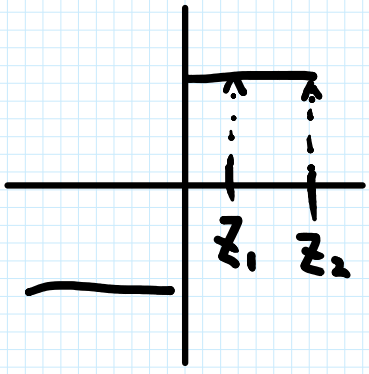


$$y = A(z)$$

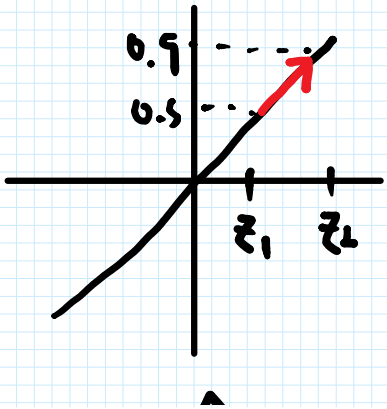
$$= A(W^Tx + b)$$

$$A(x) = \begin{cases} 1, & x > 0 \\ -1, & x \le 0 \end{cases}$$

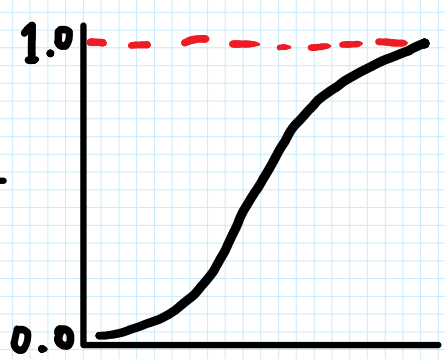
1957



1960



1961



$z = W^T x + b$

$= f(x; \theta)$

$\cong f(\theta)$

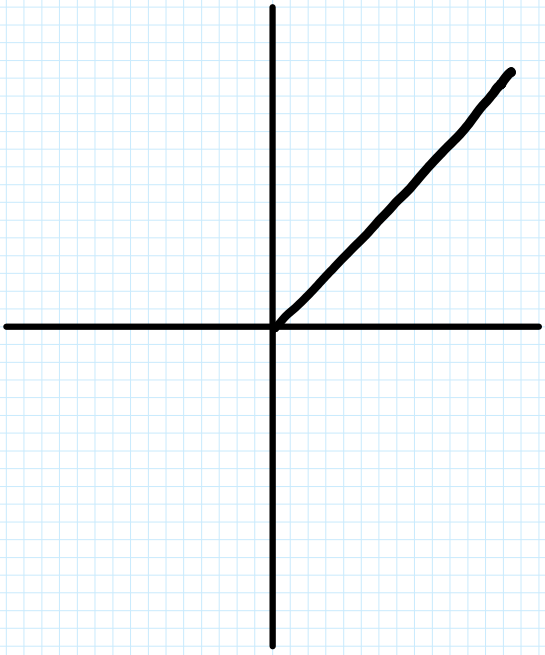
$y - \hat{y}$

$1 - 0.5 = 0.5$

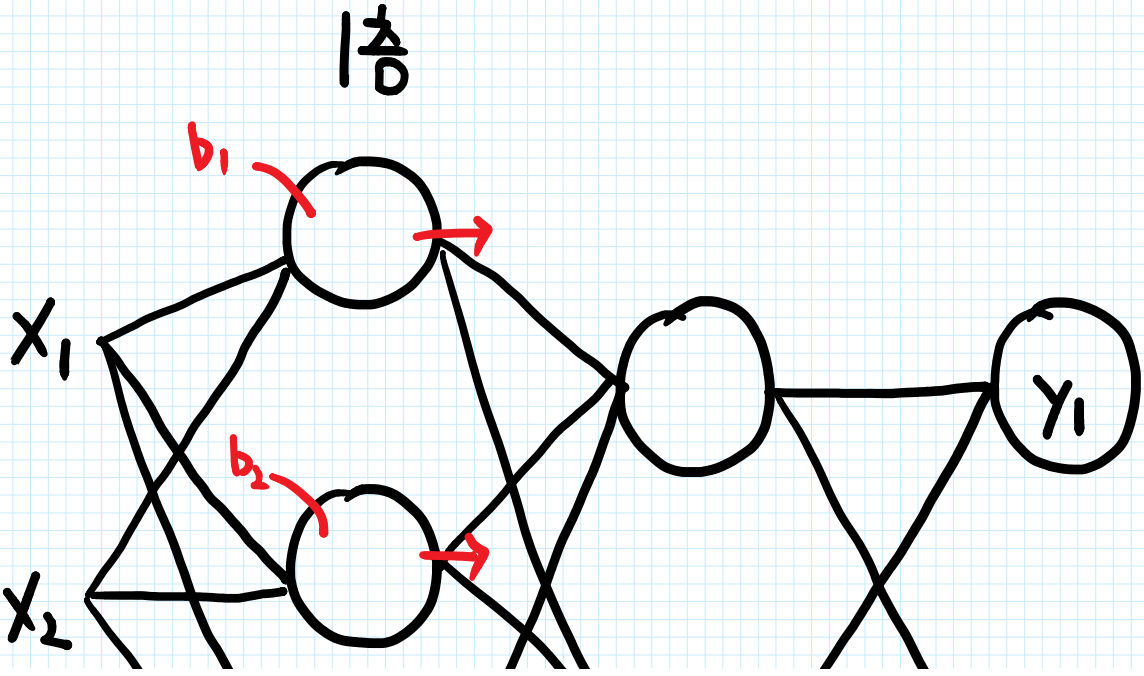
$1 - 0.9 = 0.1$

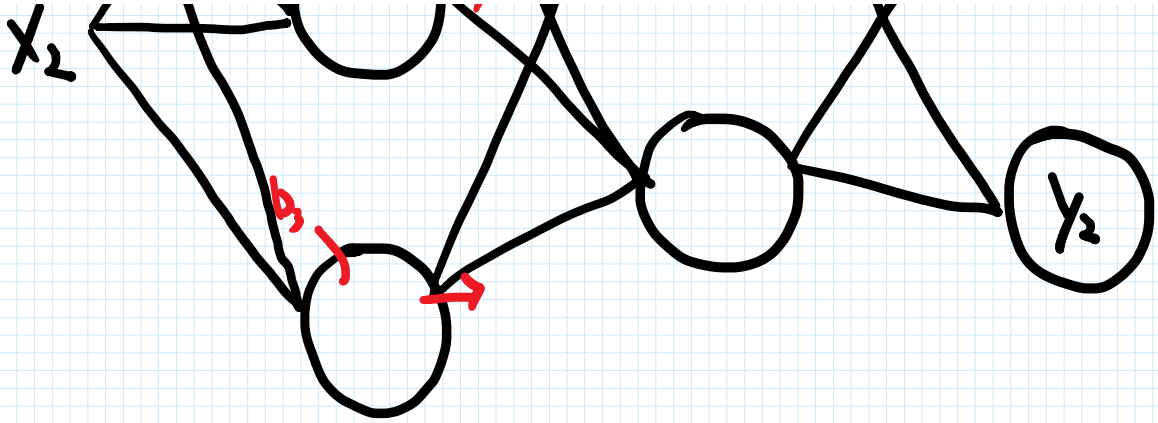
$p(y|x;\theta)$

2011 ReLu



$$y = \begin{cases} x, & x > 0 \\ 0, & x \leq 0 \end{cases}$$



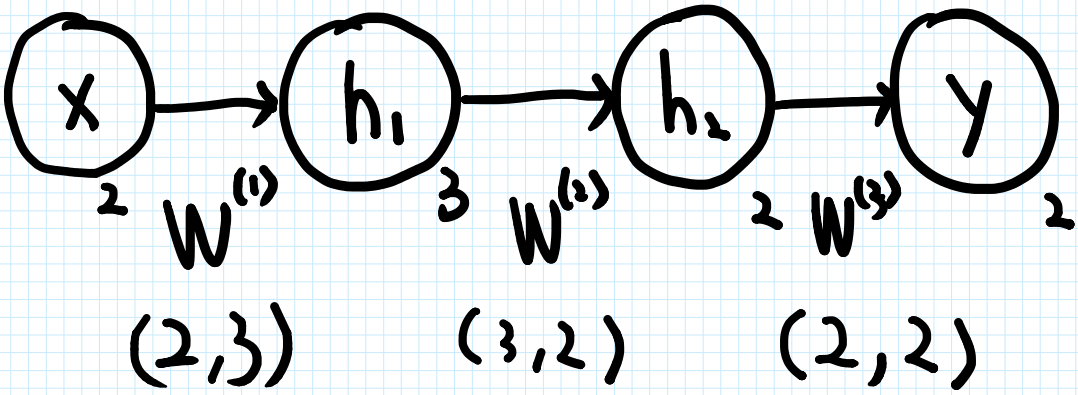


입력 → 출력

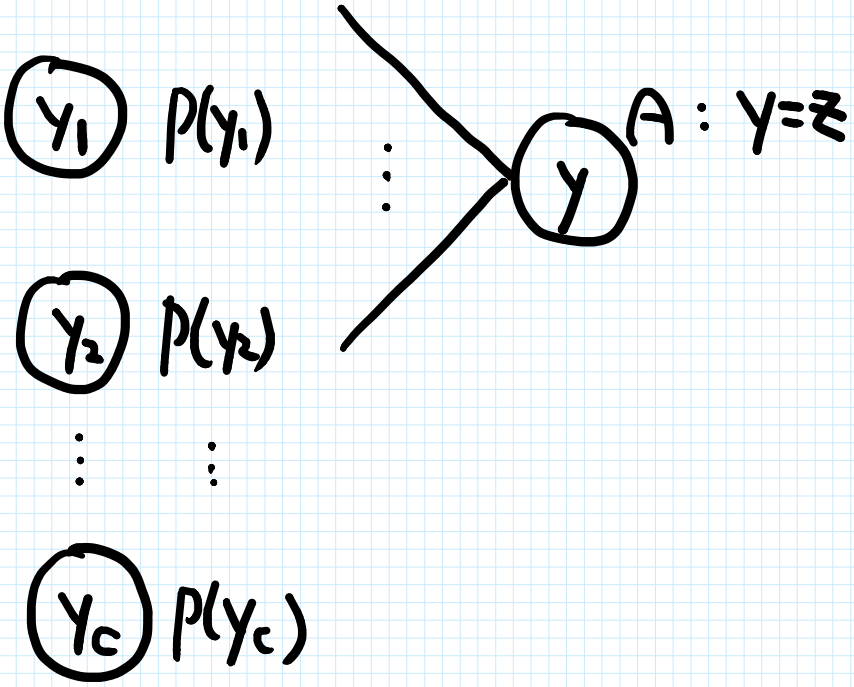
$$W^{(1)} = \begin{bmatrix} w_{11}^{(1)} & w_{21}^{(1)} & w_{31}^{(1)} \\ w_{12}^{(1)} & w_{22}^{(1)} & w_{32}^{(1)} \end{bmatrix}$$

$$W^{(2)} = \begin{bmatrix} w_{11}^{(2)} & w_{21}^{(2)} \\ w_{12}^{(2)} & w_{22}^{(2)} \\ w_{13}^{(2)} & w_{23}^{(2)} \end{bmatrix}$$

$$W^{(3)} = \begin{bmatrix} w_{11}^{(3)} & w_{21}^{(3)} \\ w_{12}^{(3)} & w_{22}^{(3)} \end{bmatrix}$$



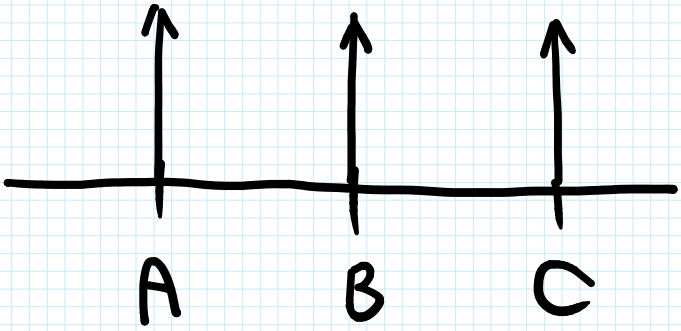
y 분류 회귀



$P(y_k)$ "k 번째 라벨 확률"

$0.60 + 0.40$ $\sum_{c} P(y_k) = 1.0$

0.34 0.33 0.33



Softmax

$[y_1 \quad y_2 \quad y_3]$

O X △